

Fire Shelter Training Reminders—2019

Fire Shelter Project Review—U.S. Department of Agriculture, Forest Service, Washington Office-Fire and Aviation Management requested the National Technology and Development (T&D) Program to review the fire shelter system, which includes the fire shelter, fireline pack, practice shelters, and training. The Fire Shelter Project Review information is available [here](#).

Training

Stigma— Many firefighters, who have deployed fire shelters, mention an apprehension when it comes to making the decision to deploy a shelter. They have been quoted as saying – “Somebody screwed up!” “It’s not a real deployment” “Here comes the investigation!” “Am I in trouble?” “They’re going to fire me!” The apprehension, often relates to the stigma that comes with fire shelters. Firefighters have suffered burn injuries and severe smoke inhalation due to that apprehension resulting in delaying the deployment of a fire shelter. Deploying a shelter does not need to be an unquestionable last-second lifesaving event. Does this mean that you should deploy a shelter every time a tree torches? No. However, if you feel your situation is uncertain and can be improved by deploying a shelter, use it. The [Fall 2011](#) edition of the Wildland Fire Lessons Learned Center’s *Two More Chains* addresses this issue.

Shelter Deployment Training—As a firefighter, you practice entrapment avoidance in order to stay out of situations where you need to deploy a fire shelter, but you can still find yourself in a situation where you’re entrapped by fire and need to deploy a shelter. You must take training seriously, because you never know when you may need to deploy a fire shelter. It can happen to ANYONE! [Video link](#).

To enhance training, NTDP recently produced a video collection entitled “Fire Shelter Deployments: Stories and Common Insights.” You can view these videos on the Wildland Fire Lessons Learned Center YouTube channel [here](#). You can also order a DVD of this collection through NTDP at 406-329-3900.

Practice shelter deployments while wearing personal protective equipment (PPE)—especially gloves—in a high-stress environment, with time constraints, and in different positions such as standing, kneeling, and lying down. Examples of how to add stress to training include using blindfolds, loud noise, or by making firefighters share a shelter. Adding high ventilation fans to simulate wind and utilizing outdoor conditions also helps to create practice that is more realistic. You can find additional training materials [here](#).

Shelter Inspection— Ensure that you are carrying a serviceable fire shelter. Use shelter inspection criteria to inspect shelters at the start of every fire season and periodically throughout the season. Review the “Fire Shelter Inspection Guide and Rebag Direction,” tech tip [here](#). Take shelters that don’t pass inspection out of service and use them for practice deployments.

Practice Shelters— Firefighters who have deployed real shelters have indicated that these shelters are not the same as practice shelters. Whenever possible, use out-of-service, real shelters to provide training that is more realistic. The stiffer, heavier material of real shelters does not shake open as easily. The Velcro tear strips of the practice shelter PVC bags and the real shelter bag tear strips differ as well. This [short video](#) shows some differences.

Repacking practice shelters can be quite cumbersome. This [short video](#) provides direction on how to easily refold and repack a practice shelter.

Shelter PVC Bags— Firefighters who have deployed real shelters indicated that training PVC bags open with much less effort than real shelter PVC bags. Expect to open the bag with a quick, strong pull down of the red tear strip. In addition, a high-temperature environment can soften the shelter's PVC bag, making it more difficult to tear open. Make sure to deploy your shelter before dangerous high temperatures arrive at the deployment site.

Shake Handles – The purpose of the shake handle is to assist in a speedy deployment. You should find the real shelter shakes out easier if you spread your arms wide and use short jerky shakes. Shake handles were derived by evaluating practice deployments from the previous shelter design, many firefighters struggled getting the shelter fully open. They would shake the shelter many times from an end, which would only partially open the shelter. Shaking the shelter from its side, where the handles are located, enables the unfurling to be quicker and more complete with only a couple shakes. Even if you grab the wrong handles or only shake one handle, it will open quicker than shaking from an end.

Entrapment and Fire Shelter Deployment

Escape Routes— Identify, flag, and monitor travel times for escape routes and safety zones throughout the day. Often, escape routes or safety zones that are adequate for the morning will be inadequate for the higher fire intensities associated with afternoon burning periods. Removing your pack and carrying only your fire shelter can speed your escape. Conditions can quickly deteriorate, be prepared to deploy your shelter.

Safety Zones— Firefighters cannot determine the true effectiveness of a safety zone until after the fire passes. If you committed to a safety zone and are uncertain about its viability, be prepared to deploy your shelter.

Entrapment— When entrapment is imminent, do not wait until the heat drives you to deploy your shelter. Deploy well before the fire arrives. Waiting too long to deploy your shelter can leave you exposed to dangerous levels of heat.

Deployment Site Selection – Pick a site that has the sparsest fuels and where it is least likely that flames and convective heat will contact the shelter. Avoid chimneys, saddles, and draws.

Moving – Moving in a shelter or using it as a shield to move has been done before. However, it may expose your airway to extreme, even fatal air temperatures.

Amount of Protection—Fire shelters provide their best protection in a radiant heat environment and less protection against convective heat and direct flame contact. Selecting the best available site to deploy your shelter is very important. Deploy the shelter at a site that will minimize, as much as possible, exposure to convective heat and flame contact. NTDP conducted fire shelter tests in both laboratory and wildland environments. The short video, "[Comparing the New Generation and Old-Style Fire Shelters, May 5, 2006](#)" shows a test in a wildland fire environment.

During development of the current shelter, fire shelters were subjected to a variety of lab tests including radiant and convective heat scenarios. In the radiant test, shelters were exposed to 40 kW/m² of heat flux for 5 minutes. The current shelter showed a non-injuring rise in temperature of 140 °F and a heat flux of 1.5 kW/m². An exposure of 40 kW/m² would be fatal to an unsheltered human. In the convective test, shelters were exposed to flames of 80 kW/m² of heat flux and temperature of 1300 °F for 20 seconds. The current shelter showed a non-injuring rise in temperature of 100 °F and a heat flux of 1.3

kW/m². An exposure of 80 kW/m² for 20 seconds would be fatal to an unsheltered human. Limitations of the test facility prevented an exposure of longer duration.

Current testing involves a more severe convective test that lasts much longer than the previous 20-second test. The current shelter has survivable conditions an average time of 54 seconds. Watch [here](#). It is not uncommon for wildland fires to reach more than 180 kW/m² of heat flux and temperatures exceeding 1900 °F with turbulent winds. Flaming fronts usually burn through a site within 75 seconds. Depending on fuel loading, conditions do not become survivable for many minutes afterwards.

High Winds— Deploying a shelter in windy conditions is difficult. Lie on the ground to unfold and deploy the shelter. This [short video](#) shows a firefighter deploying fire shelters in 50 mile per hour winds created by the Forest Service's DC-3 airplane.

Gloves— Wildland firefighting gloves are designed to provide appropriate protection from heat and physical hazards. The gloves provide limited dexterity when fine motor skills may be needed. Wear gloves while working in a fire area, except when you need fine motor skills. If you remove the gloves, remember to put them back on. Review the tech tip "[Firefighters' Leather Gloves Redesigned To Be More Comfortable](#)".

Water— Only take your water bottle into the shelter with you if it is convenient and time permits.

Radio— Only take your radio into the shelter with you if it is convenient and time permits. Fire shelters can inhibit the ability of a radio to transmit and receive. You can slide the radio antenna out from under the shelter for better reception; only attempt to do this when you feel it will not allow dangerous levels of heat to enter the shelter. Review the tech tip "[Fire Shelters Weaken Transmissions From Hand-Held Radios](#)". Many firefighters have mentioned the calming effect of being able to communicate, but it is rare when outside entities, aviation or otherwise, are able to rescue firefighters inside shelters.

If you have an external radio microphone cord woven through your fireline pack webbing, practice detaching the mic chord from the radio under a mock high-stress and time-constrained situation. Remember, radios are less effective inside a shelter.

Risk Management – Risk homeostasis is a theory that predicts with more perceived protection given to a person, the more risk they are willing to take. Even though the current M-2002 shelter offers significantly more protection than the old-style shelter, fire shelter deployment numbers have decreased. From 1996 to 2009, the average number of shelters deployed per year was 28. Since 2010, when the M-2002 became mandatory, the average is seven shelters.

Remember— Weigh the risks of your assignment. Fires occur in a dynamic environment where drastic changes can arise very quickly. Never take added risks because you are carrying a fire shelter. The fire shelter cannot provide sufficient protection in all fire situations.

Be sure to communicate with your subordinates, supervisors, friends and family that fire shelters have protective limitations.

Comments or questions? – Contact Tony Petrilli, U.S. Forest Service, National Technology and Development Program, Fire Shelter Project Leader at apetrilli@fs.fed.us or 406-329-3965.